SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-42

Name: Clear Lake **County**: Minnehaha
Legal Description: T103-R51-Sec. 6; T103-R52-Sec. 1; T104-R51-Sec. 31; T104-R52-Sec. 36
Location from nearest town: 3 mi. west, 2 mi. south, and ¾ mi. west of Colton, SD
Dates of present survey: June 27-28, 2009
Dates of the last survey: June 27-28, 2007
Management classification: Warmwater Marginal

Primary Game Species	Other Species
Yellow Perch	Black Bullhead
Northern Pike	Common Carp
Walleye	White Sucker
	Green Sunfish
	Orange-spotted Sunfish

PHYSICAL DATA

Surface Area: 472 acres **Watershed**: No data
Maximum depth: 11 feet **Mean depth**: 4 feet
Volume: No data **Shoreline length**: No data
Contour map available: No **Date mapped**: NA
OHWM elevation: None set **Date set**: NA
Outlet elevation: None set **Date set**: NA
Lake elevation observed during the survey: Full
Beneficial use classifications: (6) warmwater marginal fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) wildlife propagation and stock watering.

Introduction

Clear Lake, a shallow, natural lake located in northwestern Minnehaha County, was named for the clear water it contained decades ago. The lake is now heavily degraded and suffers numerous algae blooms and fish kills. It receives its water from a relatively small local watershed and ground water. Outflows exit down a small, unnamed creek to Skunk Creek and then the Big Sioux River.

Describe Ownership of Lake and Adjacent Lakeshore Properties

Clear Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. The South Dakota Department of Game, Fish, and Parks (GFP) owns and manages Game Production Areas (GPAs) on the east and south shores of the lake. The United States Fish and Wildlife Service (USFWS) owns and manages a Waterfowl Production Area (WPA) on the north shore. The remainder of the shoreline is privately owned.

Fishing Access

Clear Lake has a boat ramp on the east side that needs to be replaced and is only usable by small boats. Shore fishing is difficult due to lack of access. Ice fishing is the most popular activity on the lake.

Field Observations of Water Quality and Aquatic Vegetation

During the survey, the water clarity was poor with a Secchi depth measurement of only 25 cm (10.0 inches) due to excessive algae. No aquatic vegetation was observed.

BIOLOGICAL DATA

Methods:

Clear Lake was sampled on June 24-25, 2009 with three overnight gill-net sets and five overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh (3/4 in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. Gill-net and trap-net sites are displayed in Figure 2.

Results and Discussion:

Gill Net Catch

Black bullhead (80%) was the most abundant species sampled in the gill nets (Table 1). Yellow perch, orange-spotted sunfish were also sampled.

Table 1. Total catch from three overnight gill net sets at Clear Lake, Minnehaha County, June 24-25, 2009.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	8	80.0	2.7	±2.3	33.7	--	--	--
Yellow Perch	1	10.0	0.6	±0.4	12.0	--	--	--
O. S. Sunfish	1	10.0	0.6	±0.4	0.8	--	--	--

* 5 years (1999, 2001, 2003, 2005, 2007)

Trap Net Catch

Common carp and black bullheads comprised 98.3% of the trap net catch this year (Table 2). Other species sampled included orange spotted sunfish, white sucker, and yellow perch.

[1] See Appendix A for definitions of CPUE, PSD, and mean Wr.

Table 2. Total catch from five overnight trap net sets at Clear Lake, Minnehaha County, June 24-25, 2009.

Species	Number	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Common Carp	265	51.0	53.0	±34.0	3.4	--	--	--
Black Bullhead	246	47.3	49.2	±15.2	405.2	16	0	107
O. S. Sunfish	4	0.8	0.8	±0.7	7.7	--	--	--
White Sucker	3	0.6	0.6	±0.8	0.2	--	--	--
Yellow Perch	2	0.4	0.4	±0.5	1.2	--	--	--

* 5 years (1999, 2001, 2003, 2005, 2007)

Yellow Perch

Management objective: Maintain a yellow perch population with a gill-net CPUE of at least 50 and a PSD range of 30-60.

Yellow perch numbers remain low (Table 3) in spite of considerable stocking effort for many years (Table 6).

Table 3. Yellow perch gill-net CPUE, PSD, and mean Wr for Clear Lake, Minnehaha County, 2001-2009.

	2001	2002	2003	2004	2005	2006	2007	2008	2009
CPUE	0.3		1.0		10.3		4.3		0.3
PSD	--		--		84		69		--
RSD-P	--		--		29		8		--
Mean Wr	--		--		105		100		--

Black Bullhead

Management objective: Maintain a black bullhead population with a trap-net net CPUE of less than 100.

Clear Lake has a history of overabundant black bullhead populations (Table 4). However, it appears a large portion of the population was killed during the 2009 winterkill. The bullheads sampled in this year's survey ranged in length from 120-280 mm. (4.7-11.0 in) (Figure 1).

Table 4. Black bullhead trap-net CPUE, PSD, and mean Wr for Clear Lake, Minnehaha County, 2001-2009.

	2001	2002	2003	2004	2005	2006	2007	2008	2009
CPUE	15.7		1499.4		200.4		211.8		49.2
PSD	2		9		4		26		16
RSD-P	0		0		0		0		0
Mean Wr	--		90		91		91		107

All Species

Most species have decreased in abundance in Clear Lake (Table 5), due to a partial winterkill early in 2009.

Table 5. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Clear Lake, Minnehaha County, 2001-2009.

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009
COC (GN)	0.3		9.0		1.3		7.7		--
COC (TN)	2.1		3.8		4.0		6.4		53.0
WHS (GN)	--		--		--		--		--
WHS (TN)	0.4		--		--		0.6		0.6
BLB (GN)	--		62.5		44.3		47.7		2.7
BLB (TN)	15.7		1499.4		200.4		211.8		49.2
NOP (GN)	--		--		3.0		0.3		--
NOP (TN)	0.1		--		11.8		--		--
GSF (GN)	--		--		--		--		--
GSF (TN)	2.9		0.4		0.2		2.4		--
OSF (GN)	--		--		1.0		--		0.3
OSF (TN)	0.3		--		--		38.0		0.8
YEP (GN)	0.3		1.0		10.3		4.3		0.3
YEP (TN)	15.1		0.8		0.6		--		0.4
WAE (GN)	--		--		0.3		0.3		--
WAE (TN)	--		--		--		--		--

COC (Common Carp), WHS (White Sucker), BLB (Black Bullhead), NOP (Northern Pike), GSF (Green Sunfish), OSF (Orange-spotted Sunfish), YEP (Yellow Perch), WAE (Walleye)

MANAGEMENT RECOMMENDATIONS

1. Continue to manage Clear Lake as a marginal northern pike, perch/bullhead fishery. Stock northern pike fry, yellow perch adults following winterkills and manage the bullhead population with commercial fishing or Department removals as needed.

2. Attempt to identify potential causes for the inability to create a viable fishery.

Table 6. Stocking record for Clear Lake, Minnehaha County, 1997-2009.

Year	Number	Species	Size
1997	4,722	Yellow Perch	Adult
1998	4,680	Yellow Perch	Adult
2000	28,152	Yellow Perch	Juvenile
2001	5,040	Yellow Perch	Juvenile
2002	23,570	Yellow Perch	Juvenile
2003	154	Yellow Perch	Juvenile
	4,229	Yellow Perch	Fingerling
2004	1,144	Northern Pike	Adult
	7,963	Yellow Perch	Fingerling
	100	Yellow Perch	Adult
2005	472	Northern Pike	Adult
	94,300	Walleye	Fingerling
2006	5,670	Yellow Perch	Juvenile
2007	765	Yellow Perch	Juvenile
	275	Yellow Perch	Adult
2008	48,000	Walleye	Fingerling
	12,636	Yellow Perch	Fingerling

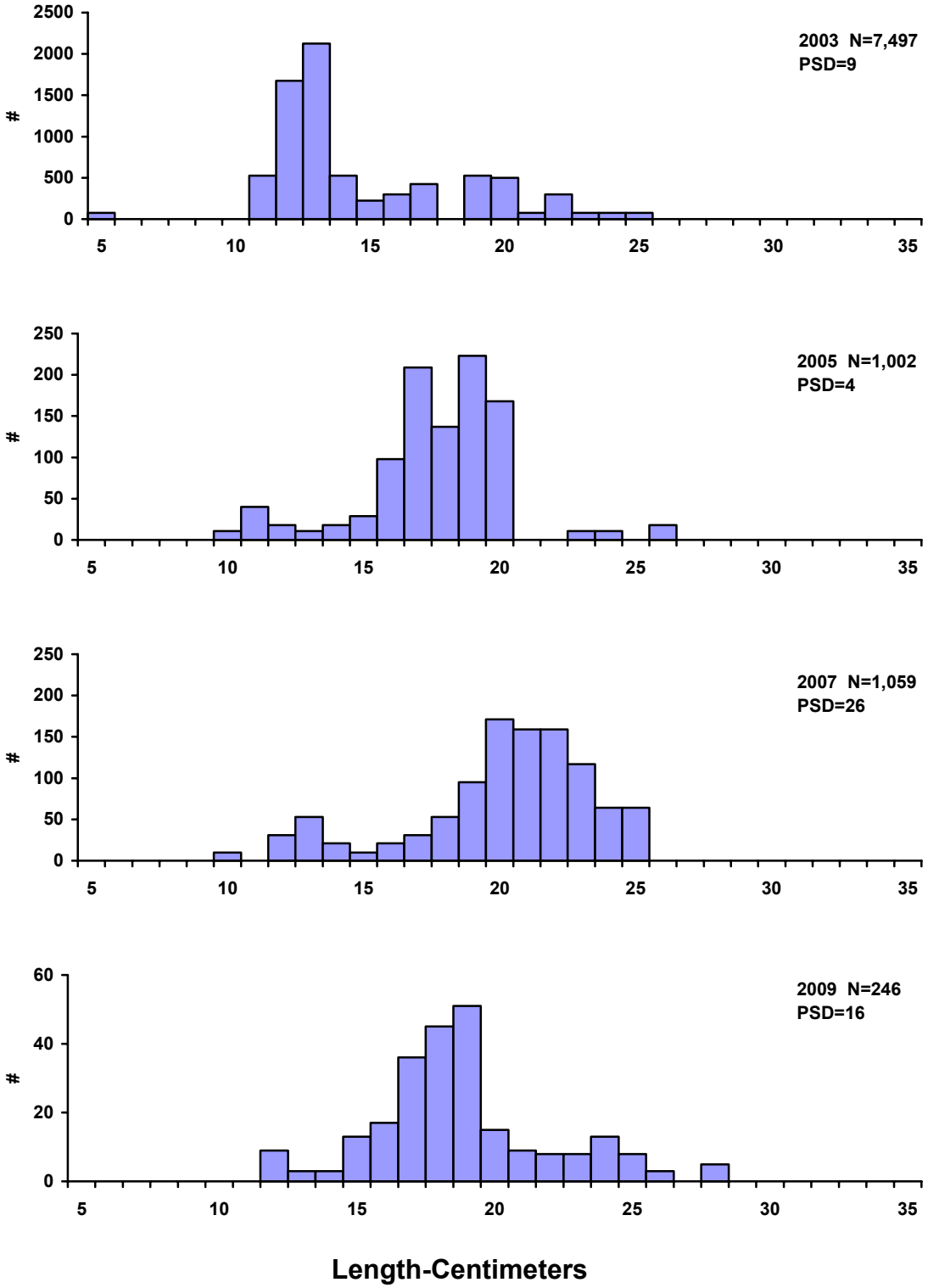

Figure 1. Length frequency histogram for black bullheads sampled in trap nets from Clear Lake, Minnehaha County, 2003, 2005, 2007, and 2009.

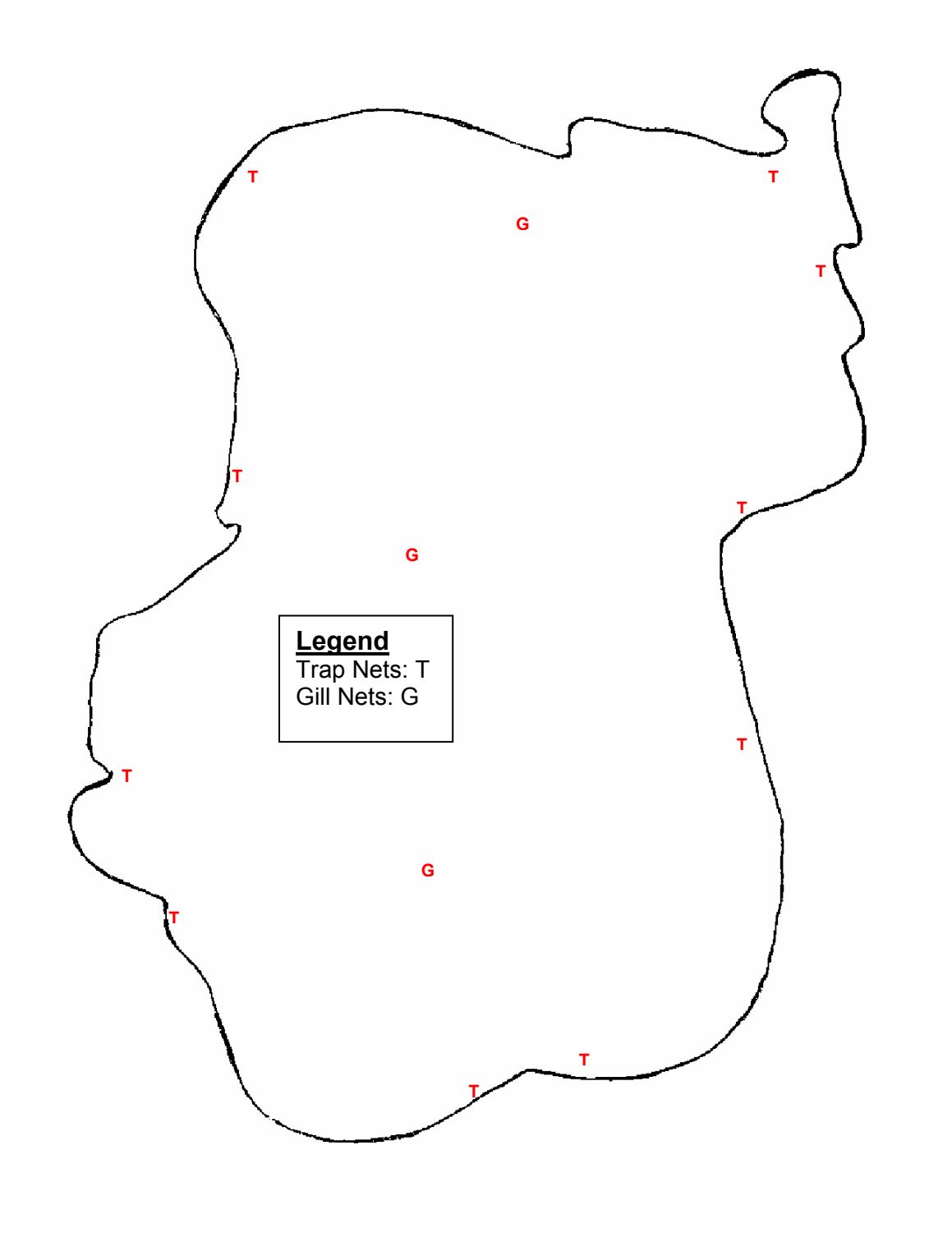

Figure 2. Sampling locations on Clear Lake, Minnehaha County, 2009.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.